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(19) World Intellectual Property Organization
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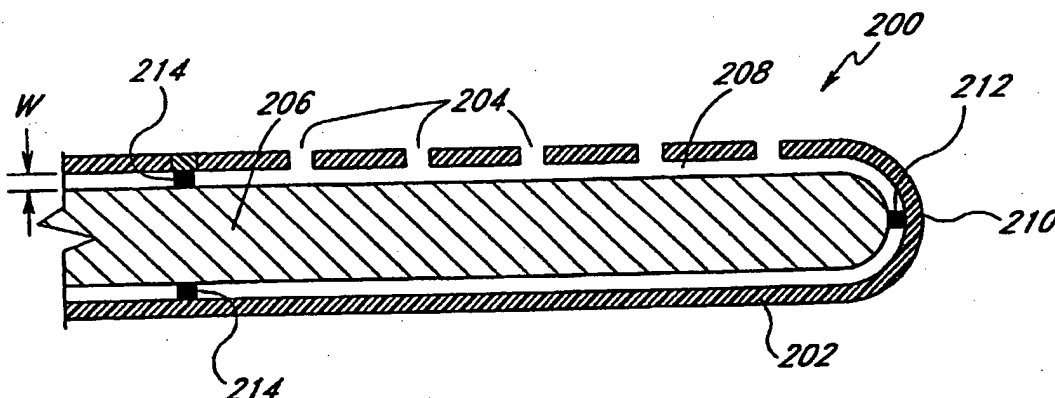
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WO 01/05210 A3

- (51) International Patent Classification⁷: A61M 25/00
- (21) International Application Number: PCT/US00/19746
- (22) International Filing Date: 19 July 2000 (19.07.2000)
- (25) Filing Language: English
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- (30) Priority Data:
09/363,228 19 July 1999 (19.07.1999) US
- (71) Applicant (for all designated States except US): I-FLOW CORPORATION [US/US]; 20202 Windrow Drive, Lake Forest, CA 92630 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): DENIEGA, Jose, Castillo [US/US]; 20961 Eagles Glenn, Lake Forest, CA 92630 (US). MASSENGALE, Roger [US/US]; 28 Harverson, Mission Viejo, CA 92692 (US). RAKE, Kenneth, W. [US/US]; 29625 Vista Ladera, Laguna Niguel, CA 92677 (US).
- (74) Agent: NATAUPSKY, Steven, J.; Knobbe, Martens, Olson & Bear, LLP, 620 Newport Center Drive, 16th floor, Newport Beach, CA 92660 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report

[Continued on next page]

(54) Title: CATHETER FOR UNIFORM DELIVERY OF MEDICATION



WO 01/05210 A3

(57) Abstract: The present invention provides a catheter for the delivery of fluid medication across an anatomical region. In accordance with one embodiment, the catheter comprises an elongated tube with a plurality of exit holes along an infusion section of the catheter, and an elongated flexible porous member residing within the tube and forming an annular space between the tube and the member. In accordance with other embodiments, the catheter includes a tube having a plurality of exit holes in a side wall of the tube. The exit holes may combine to form a flow-restricting orifice of the catheter. Advantageously, fluid within the catheter flows through all of the exit holes, resulting in uniform distribution of fluid within an anatomical region. In one particular embodiment, the catheter comprises a tube having elongated exit slots therein. In accordance with other embodiments, the catheter includes an elongated tubular member made of a porous membrane. The porous membrane is configured so that a fluid introduced into an open end of the tubular member will flow through side walls of the tubular member at a substantially uniform rate along a length of the tubular member. In accordance with other embodiments, the catheter includes an elongated "weeping" tubular coil spring attached to an end of, or enclosed within, a tube. Fluid within the spring and greater than or equal to a threshold pressure advantageously flows radially outward between the spring coils. Advantageously, the fluid is dispensed substantially uniformly throughout a length of the spring.



(88) Date of publication of the international search report:
19 July 2001

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/19746

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61M25/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A A	<p>WO 92 00113 A (CARDIOVASCULAR THERAPEUTIC TEC.) 9 January 1992 (1992-01-09) abstract; figures 1,2,6,7</p> <p>---</p> <p>WO 96 33761 A (MEDTRONIC, INC.) 31 October 1996 (1996-10-31)</p> <p>abstract; claims 1,6-8; figures 3,5</p> <p>---</p> <p>-/--</p>	<p>1,2,13</p> <p>3-10, 14-28, 30-45, 47-53</p> <p>1-10, 13-16, 18-28, 30-45, 47-53</p>

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- *G* document member of the same patent family

Date of the actual completion of the international search

30 January 2001

Date of mailing of the international search report

08. 02. 2001

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/19746

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 5 066 278 A (HIRSCHBERG ET AL.) 19 November 1991 (1991-11-19) abstract column 5, line 35 - line 44; figures 1,3 ---	11,12, 54-56, 58,59
X	WO 97 49447 A (THEROX INC.) 31 December 1997 (1997-12-31) abstract page 18, line 34 -page 19, line 12 page 20, line 29 - line 35; figures 9,10,23,24 ---	60-62, 64-68, 70-72
X	US 5 356 388 A (SEPETKA ET AL.) 18 October 1994 (1994-10-18) abstract column 3, line 50 - line 61 column 4, line 5 - line 15 column 5, line 24 - line 32; figures 1-7 ---	60-62, 64-68, 70-72
A	US 5 846 216 A (BOYD ET AL.) 8 December 1998 (1998-12-08) ---	
A	US 5 269 755 A (BODICKY) 14 December 1993 (1993-12-14) ---	
A	US 3 595 241 A (SHERIDAN) 27 July 1971 (1971-07-27) -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 00/19746

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 17, 29, 46, 57, 63, 69
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-10, 13-16, 18-28, 30-45, 47-53

Catheter for uniformly delivering a drug through a porous distribution section and method of manufacturing the catheter

2. Claims: 11,12, 54-56, 58,59

Catheter for uniformly delivering a drug through exit slots or holes of varying size and method of manufacturing the catheter

3. Claims: 60-62, 64-68, 70-72

Catheter for uniformly delivering a drug through gaps of a tubular coil spring and method of manufacturing the catheter

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/19746

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9200113 A	09-01-1992	EP 0536296 A JP 6503972 T	14-04-1993 12-05-1994
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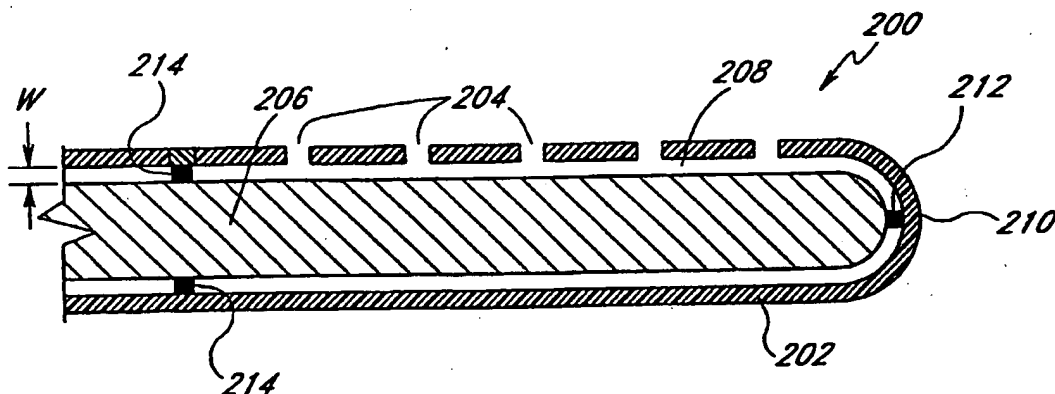
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- (71) Applicant (for all designated States except US): **I-FLOW CORPORATION [US/US]; 20202 Windrow Drive, Lake Forest, CA 92630 (US).**
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **DENIEGA, Jose, Castillo [US/US]; 20961 Eagles Glenn, Lake Forest, CA 92630 (US). MASSENGALE, Roger [US/US]; 28 Harveston, Mission Viejo, CA 92692 (US). RAKE, Kenneth, W. [US/US]; 29625 Vista Ladera, Laguna Niguel, CA 92677 (US).**
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- (84) Designated States (*regional*): **ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).**
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Date of the actual completion of the international search

30 January 2001

Date of mailing of the international search report

08. 02. 2001

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Michels, N

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/19746

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Remark on Protest

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☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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Catheter for uniformly delivering a drug through exit slots or holes of varying size and method of manufacturing the catheter

3. Claims: 60-62, 64-68, 70-72

Catheter for uniformly delivering a drug through gaps of a tubular coil spring and method of manufacturing the catheter

INTERNATIONAL SEARCH REPORT

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